

SEQUENCE LISTING

<110> De Samblanx, Genoveva  
Broekaert, Willem  
Rees, Sarah

<120> Antifungal Proteins

<130> SYN-034DV

<140>

<141>

<150> 09/077,951

<151> 1998-06-10

<150> GB 9525474.4

<151> 1995-12-13

<150> PCT/GB96/03065

<151> 1996-12-12

<160> 77

<170> PatentIn Ver. 2.0

<210> 1

<211> 36

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:primer

<400> 1

tatcagtcga cgcatgctat tgataagatt taaagg

36

<210> 2

<211> 37

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:primer

<400> 2

aataagcttg gacaagagac agaagttgtg ccaaagg

37

<210> 3

<211> 28

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:primer

<400> 3

aaggatccct attaacaagg aaagtagc 28

<210> 4  
 <211> 28  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:primer

<400> 4  
 aatgctagct cagaagttgt gccaaagg 28

<210> 5  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:primer

<400> 5  
 aggaaacagc tatgaccatg 20

<210> 6  
 <211> 41  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:primer

<400> 6  
 ggaatagccg atggagatct aggaaaacag ctatgaccat g 41

<210> 7  
 <211> 24  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:primer

<400> 7  
 ggaatacccg atcgagatct agga 24

<210> 8  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 8  
 Gln Lys Leu Cys Glu Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
 1 5 10 15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Asn Leu Glu Lys Ala Arg  
 20 25 30

His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
           35                          40                          45

Phe Pro Cys  
           50

<210> 9  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 9  
 Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
   1                          5                          10                          15

Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
                   20                          25                          30

His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
           35                          40                          45

Phe Pro Cys  
           50

<210> 10  
 <211> 50  
 <212> PRT  
 <213> Raphanus sativus

<400> 10  
 Lys Leu Cys Glu Arg Ser Ser Gly Thr Trp Ser Gly Val Cys Gly Asn  
   1                          5                          10                          15

Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Gly Ala Gln His  
                   20                          25                          30

Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr Phe  
           35                          40                          45

Pro Cys  
           50

<210> 11  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 11  
 Gln Lys Leu Cys Glu Arg Ser Ser Gly Thr Trp Ser Gly Val Cys Gly  
   1                          5                          10                          15

Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Asn Leu Glu Gly Ala Arg  
                   20                          25                          30

His Gly Ser Cys Asn Tyr Ile Phe Pro Tyr His Arg Cys Ile Cys Tyr  
 35 40 45

Phe Pro Cys  
 50

<210> 12  
 <211> 27  
 <212> PRT  
 <213> Brassica rapa

<400> 12  
 Gln Lys Leu Cys Glu Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
 1 5 10 15

Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Asn  
 20 25

<210> 13  
 <211> 27  
 <212> PRT  
 <213> Brassica rapa

<220>  
 <221> SITE  
 <222> (11)  
 <223> Xaa is a non-standard amino acid; thought to be a  
 post-translational modification of a standard  
 amino acid

<400> 13  
 Gln Lys Leu Cys Glu Arg Pro Ser Gly Thr Xaa Ser Gly Val Cys Gly  
 1 5 10 15

Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg  
 20 25

<210> 14  
 <211> 30  
 <212> PRT  
 <213> Brassica napus

<400> 14  
 Gln Lys Leu Cys Glu Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
 1 5 10 15

Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Asn Leu Glu Lys  
 20 25 30

<210> 15  
 <211> 23  
 <212> PRT  
 <213> Brassica napus

&lt;400&gt; 15

Gln Lys Leu Cys Glu Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
 1 5 10 15

Asn Asn Asn Ala Cys Lys Asn  
 20

&lt;210&gt; 16

&lt;211&gt; 25

&lt;212&gt; PRT

&lt;213&gt; Sinapis alba

&lt;400&gt; 16

Gln Lys Leu Cys Glu Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
 1 5 10 15

Asn Asn Asn Ala Cys Lys Asn Gln Cys  
 20 25

&lt;210&gt; 17

&lt;211&gt; 26

&lt;212&gt; PRT

&lt;213&gt; Sinapis alba

&lt;400&gt; 17

Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
 1 5 10 15

Asn Asn Asn Ala Cys Arg Asn Gln Cys Ile  
 20 25

&lt;210&gt; 18

&lt;211&gt; 27

&lt;212&gt; PRT

&lt;213&gt; Arabidopsis thaliana

&lt;400&gt; 18

Gln Lys Leu Cys Glu Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
 1 5 10 15

Asn Ser Asn Ala Cys Lys Asn Gln Cys Ile Asn  
 20 25

&lt;210&gt; 19

&lt;211&gt; 414

&lt;212&gt; DNA

&lt;213&gt; Raphanus sativus

&lt;400&gt; 19

gttttatttag tgatcatggc taagtttgcg tccatcatcg cacttctttt tgctgctctt 60  
 gttcttttttg ctgcttttoga agcaccaaca atggtggaag cacagaagtt gtgcgaaagg 120  
 ccaagtggga catggtcagg agtctgtgga aacaataacg catgcaagaa tcagtgcatt 180  
 aaccttgaga aagcacgaca tggatcttgc aactatgtct tcccagctca caagtgtatc 240

tgctactttc cttgttaatt tatcgcaaac tctttggtga atagttttta tgtaatttac 300  
 acaaaataag tcagtgtcac tatccatgag tgattttaag acatgtacca gatatgttat 360  
 gttggttcgg ttatacaaat aaagttttat tcaccaaaaa aaaaaaaaaa aaaa 414

<210> 20  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 20  
 Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
 1 5 10 15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
 20 25 30  
 His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
 35 40 45  
 Phe Pro Cys  
 50

<210> 21  
 <211> 47  
 <212> PRT  
 <213> Sorghum bicolor

<400> 21  
 Arg Val Cys Met Lys Gly Ser Ala Gly Phe Lys Gly Leu Cys Met Arg  
 1 5 10 15  
 Asp Gln Asn Cys Ala Gln Val Cys Leu Gln Glu Gly Trp Gly Gly Gly  
 20 25 30  
 Asn Cys Asp Gly Val Met Arg Gln Cys Lys Cys Ile Arg Gln Cys  
 35 40 45

<210> 22  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 22  
 Gln Lys Leu Cys Met Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
 1 5 10 15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
 20 25 30  
 His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
 35 40 45  
 Phe Pro Cys  
 50

<210> 23  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 23  
 Gln Lys Leu Cys Gln Arg Pro Ser Gly Gly Trp Ser Gly Val Cys Gly  
   1                  5                  10                  15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
           20                  25                  30  
 His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
           35                  40                  45  
 Phe Pro Cys  
       50

<210> 24  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 24  
 Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Ser Ser Gly Val Cys Gly  
   1                  5                  10                  15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
           20                  25                  30  
 His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
           35                  40                  45  
 Phe Pro Cys  
       50

<210> 25  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 25  
 Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Met  
   1                  5                  10                  15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
           20                  25                  30  
 His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
           35                  40                  45  
 Phe Pro Cys  
       50

<210> 26  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 26  
 Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
   1                  5                  10                  15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Trp Arg  
                   20                  25                  30  
 His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
           35                  40                  45  
 Phe Pro Cys  
       50

<210> 27  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 27  
 Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
   1                  5                  10                  15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
                   20                  25                  30  
 His Gly Ser Cys Asn Gly Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
           35                  40                  45  
 Phe Pro Cys  
       50

<210> 28  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 28  
 Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
   1                  5                  10                  15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
                   20                  25                  30  
 His Gly Ser Cys Asn Tyr Val Met Pro Ala His Lys Cys Ile Cys Tyr  
           35                  40                  45  
 Phe Pro Cys  
       50



<210> 29  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 29  
 Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
 1 5 10 15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
 20 25 30  
 His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Gln Cys Ile Cys Tyr  
 35 40 45  
 Phe Pro Cys  
 50

<210> 30  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 30  
 Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
 1 5 10 15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
 20 25 30  
 His Gly Ser Cys Asn Tyr Val Pro Pro Ala His Lys Cys Ile Cys Ile  
 35 40 45  
 Phe Pro Cys  
 50

<210> 31  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 31  
 Gln Lys Leu Cys Gln Arg Pro Ser Gly Ala Trp Ser Gly Val Cys Gly  
 1 5 10 15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
 20 25 30  
 His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
 35 40 45  
 Phe Pro Cys  
 50

<210> 32  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 32  
 Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
   1                  5                  10                  15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
           20                  25                  30  
 Ala Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
           35                  40                  45  
 Phe Pro Cys  
       50

<210> 33  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 33  
 Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
   1                  5                  10                  15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
           20                  25                  30  
 His Gly Ser Cys Asn Ala Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
           35                  40                  45  
 Phe Pro Cys  
       50

<210> 34  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 34  
 Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
   1                  5                  10                  15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
           20                  25                  30  
 His Gly Ser Cys Asn Tyr Val Ala Pro Ala His Lys Cys Ile Cys Tyr  
           35                  40                  45  
 Phe Pro Cys  
       50

<210> 35  
 <211> 50  
 <212> PRT  
 <213> Raphanus sativus

<400> 35  
 Gln Lys Leu Cys Gln Arg Ser Gly Thr Trp Ser Gly Val Cys Gly Asn  
   1                  5                  10                  15  
 Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg His  
                   20                  25                  30  
 Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr Phe  
                   35                  40                  45  
 Pro Cys  
       50

<210> 36  
 <211> 50  
 <212> PRT  
 <213> Raphanus sativus

<400> 36  
 Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
   1                  5                  10                  15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
                   20                  25                  30  
 His Gly Ser Cys Asn Tyr Val Pro Ala His Lys Cys Ile Cys Tyr Phe  
                   35                  40                  45  
 Pro Cys  
       50

<210> 37  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 37  
 Gln Lys Leu Cys Gln Arg Arg Ser Gly Thr Trp Ser Gly Val Cys Gly  
   1                  5                  10                  15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
                   20                  25                  30  
 His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
                   35                  40                  45  
 Phe Pro Cys  
       50

<210> 38  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 38  
 Gln Lys Leu Cys Gln Arg Pro Ser Arg Thr Trp Ser Gly Val Cys Gly  
 1 5 10 15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
 20 25 30  
 His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
 35 40 45  
 Phe Pro Cys  
 50

<210> 39  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 39  
 Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Arg Gly Val Cys Gly  
 1 5 10 15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
 20 25 30  
 His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
 35 40 45  
 Phe Pro Cys  
 50

<210> 40  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 40  
 Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
 1 5 10 15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Arg Arg Leu Glu Lys Ala Arg  
 20 25 30  
 His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
 35 40 45  
 Phe Pro Cys  
 50

<210> 41  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 41  
 Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
   1                  5                  10                  15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Arg Glu Lys Ala Arg  
                   20                  25                  30  
 His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
           35                  40                  45  
 Phe Pro Cys  
       50

<210> 42  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 42  
 Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
   1                  5                  10                  15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
                   20                  25                  30  
 His Gly Ser Cys Arg Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
           35                  40                  45  
 Phe Pro Cys  
       50

<210> 43  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 43  
 Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
   1                  5                  10                  15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
                   20                  25                  30  
 His Gly Ser Cys Asn Tyr Arg Phe Pro Ala His Lys Cys Ile Cys Tyr  
           35                  40                  45  
 Phe Pro Cys  
       50

<210> 44  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 44  
 Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
   1                  5                  10                  15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
                   20                  25                  30  
 His Gly Ser Cys Asn Tyr Val Phe Pro Arg His Lys Cys Ile Cys Tyr  
           35                  40                  45  
 Phe Pro Cys  
       50

<210> 45  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 45  
 Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
   1                  5                  10                  15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
                   20                  25                  30  
 His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Arg Cys Tyr  
           35                  40                  45  
 Phe Pro Cys  
       50

<210> 46  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 46  
 Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
   1                  5                  10                  15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
                   20                  25                  30  
 His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
           35                  40                  45  
 Arg Pro Cys  
       50

<210> 47  
 <211> 43  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:primer

<400> 47  
 aataagcttt ggacaagaga cagaagttgt gcatgaggcc aag 43

<210> 48  
 <211> 27  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:primer

<400> 48  
 ttgtgccaaa ggnnnagtgg gacatgg 27

<210> 49  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:primer

<400> 49  
 ccaagtgggg gttggtcagg 20

<210> 50  
 <211> 21  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:primer

<400> 50  
 agtgggacat cctcaggagt c 21

<210> 51  
 <211> 23  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:primer

<400> 51  
 ggagtctgta tgaacaataa cgc 23

<210> 52  
 <211> 20

<212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence:primer  
  
 <400> 52  
 tcttgcaacg gtgtcttccc 20  
  
 <210> 53  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence:primer  
  
 <400> 53  
 tgcaactatg tcatgccagc ta 22  
  
 <210> 54  
 <211> 23  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence:primer  
  
 <400> 54  
 ttcccagctc accaatgtat ctg 23  
  
 <210> 55  
 <211> 26  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence:primer  
  
 <400> 55  
 aactatgtct tcnnngctca caagtg 26  
  
 <210> 56  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence:primer  
  
 <400> 56  
 tgtatctgca tctttccttg 20  
  
 <210> 57  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus



<400> 57  
 Gln Lys Leu Cys Glu Arg Pro Ser Arg Thr Trp Ser Gly Val Cys Gly  
     1                    5                    10                    15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Asn Leu Glu Lys Ala Arg  
                     20                    25                    30  
 His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
                     35                    40                    45  
 Phe Pro Cys  
       50

<210> 58  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 58  
 Gln Lys Leu Cys Glu Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
     1                    5                    10                    15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Asn Leu Glu Lys Ala Arg  
                     20                    25                    30  
 His Gly Ser Cys Asn Tyr Arg Phe Pro Ala His Lys Cys Ile Cys Tyr  
                     35                    40                    45  
 Phe Pro Cys  
       50

<210> 59  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 59  
 Gln Lys Leu Cys Glu Arg Pro Ser Arg Thr Trp Ser Gly Val Cys Gly  
     1                    5                    10                    15  
 Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Asn Leu Glu Lys Ala Arg  
                     20                    25                    30  
 His Gly Ser Cys Asn Tyr Arg Phe Pro Ala His Lys Cys Ile Cys Tyr  
                     35                    40                    45  
 Phe Pro Cys  
       50

<210> 60  
 <211> 51  
 <212> PRT  
 <213> Raphanus sativus

<400> 60

Gln Lys Leu Cys Met Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
1 5 10 15

Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Asn Leu Glu Lys Ala Arg  
20 25 30

His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
35 40 45

Phe Pro Cys  
50

<210> 61

<211> 51

<212> PRT

<213> Raphanus sativus

<400> 61

Gln Lys Leu Cys Glu Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Met  
1 5 10 15

Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Asn Leu Glu Lys Ala Arg  
20 25 30

His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
35 40 45

Phe Pro Cys  
50

<210> 62

<211> 51

<212> PRT

<213> Raphanus sativus

<400> 62

Gln Lys Leu Cys Gln Arg Pro Ser Arg Thr Trp Ser Gly Val Cys Gly  
1 5 10 15

Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
20 25 30

His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
35 40 45

Phe Pro Cys  
50

<210> 63

<211> 51

<212> PRT

<213> Raphanus sativus

&lt;400&gt; 63

Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
 1 5 10 15

Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
 20 25 30

His Gly Ser Cys Asn Tyr Arg Phe Pro Ala His Lys Cys Ile Cys Tyr  
 35 40 45

Phe Pro Cys  
 50

&lt;210&gt; 64

&lt;211&gt; 51

&lt;212&gt; PRT

&lt;213&gt; Raphanus sativus

&lt;400&gt; 64

Gln Lys Leu Cys Gln Arg Pro Ser Arg Thr Trp Ser Gly Val Cys Gly  
 1 5 10 15

Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
 20 25 30

His Gly Ser Cys Asn Tyr Arg Phe Pro Ala His Lys Cys Ile Cys Tyr  
 35 40 45

Phe Pro Cys  
 50

&lt;210&gt; 65

&lt;211&gt; 51

&lt;212&gt; PRT

&lt;213&gt; Raphanus sativus

&lt;400&gt; 65

Gln Lys Leu Cys Met Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
 1 5 10 15

Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
 20 25 30

His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
 35 40 45

Phe Pro Cys  
 50

&lt;210&gt; 66

&lt;211&gt; 51

&lt;212&gt; PRT

&lt;213&gt; Raphanus sativus

&lt;400&gt; 66

Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Met  
 1 5 10 15

Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
 20 25 30

His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
 35 40 45

Phe Pro Cys  
 50

&lt;210&gt; 67

&lt;211&gt; 50

&lt;212&gt; PRT

&lt;213&gt; Raphanus sativus

&lt;400&gt; 67

Lys Leu Cys Glu Arg Ser Ser Arg Thr Trp Ser Gly Val Cys Gly Asn  
 1 5 10 15

Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Gly Ala Gln His  
 20 25 30

Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr Phe  
 35 40 45

Pro Cys  
 50

&lt;210&gt; 68

&lt;211&gt; 50

&lt;212&gt; PRT

&lt;213&gt; Raphanus sativus

&lt;400&gt; 68

Lys Leu Cys Glu Arg Ser Ser Gly Thr Trp Ser Gly Val Cys Gly Asn  
 1 5 10 15

Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Gly Ala Gln His  
 20 25 30

Gly Ser Cys Asn Tyr Arg Phe Pro Ala His Lys Cys Ile Cys Tyr Phe  
 35 40 45

Pro Cys  
 50

&lt;210&gt; 69

&lt;211&gt; 50

&lt;212&gt; PRT

&lt;213&gt; Raphanus sativus

&lt;400&gt; 69

Lys Leu Cys Glu Arg Ser Ser Arg Thr Trp Ser Gly Val Cys Gly Asn  
 1 5 10 15

Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Gly Ala Gln His  
 20 25 30

Gly Ser Cys Asn Tyr Arg Phe Pro Ala His Lys Cys Ile Cys Tyr Phe  
 35 40 45

Pro Cys  
 50

&lt;210&gt; 70

&lt;211&gt; 50

&lt;212&gt; PRT

&lt;213&gt; Raphanus sativus

&lt;400&gt; 70

Lys Leu Cys Met Arg Ser Ser Gly Thr Trp Ser Gly Val Cys Gly Asn  
 1 5 10 15

Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Gly Ala Gln His  
 20 25 30

Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr Phe  
 35 40 45

Pro Cys  
 50

&lt;210&gt; 71

&lt;211&gt; 50

&lt;212&gt; PRT

&lt;213&gt; Raphanus sativus

&lt;400&gt; 71

Lys Leu Cys Glu Arg Ser Ser Gly Thr Trp Ser Gly Val Cys Met Asn  
 1 5 10 15

Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Gly Ala Gln His  
 20 25 30

Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr Phe  
 35 40 45

Pro Cys  
 50

&lt;210&gt; 72

&lt;211&gt; 51

&lt;212&gt; PRT

&lt;213&gt; Raphanus sativus

Gln Lys Leu Cys Glu Arg Ser Ser Arg Thr Trp Ser Gly Val Cys Gly  
1 5 10 15

His Gly Ser Cys Asn Tyr Ile Phe Pro Tyr His Arg Cys Ile Cys Tyr  
35 40 45

Phe Pro Cys  
50

<213> Raphanus sativus

Gln Lys Leu Cys Glu Arg Ser Ser Gly Thr Trp Ser Gly Val Cys Gly  
1 5 10 15

Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Asn Leu Glu Gly Ala Arg  
20 25 30

His Gly Ser Cys Asn Tyr Arg Phe Pro Tyr His Arg Cys Ile Cys Tyr  
35 40 45

Phe Pro Cys  
50

<213> Raphanus sativus

Gln Lys Leu Cys Glu Arg Ser Ser Arg Thr Trp Ser Gly Val Cys Gly  
1 5 10 15

Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Asn Leu Glu Gly Ala Arg  
20 25 30

His Gly Ser Cys Asn Tyr Arg Phe Pro Tyr His Arg Cys Ile Cys Tyr  
35 40 45

Phe Pro Cys  
50

<213> Raphanus sativus

&lt;400&gt; 75

Gln Lys Leu Cys Met Arg Ser Ser Gly Thr Trp Ser Gly Val Cys Gly  
 1 5 10 15

Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Asn Leu Glu Gly Ala Arg  
 20 25 30

His Gly Ser Cys Asn Tyr Ile Phe Pro Tyr His Arg Cys Ile Cys Tyr  
 35 40 45

Phe Pro Cys  
 50

&lt;210&gt; 76

&lt;211&gt; 51

&lt;212&gt; PRT

&lt;213&gt; Raphanus sativus

&lt;400&gt; 76

Gln Lys Leu Cys Glu Arg Ser Ser Gly Thr Trp Ser Gly Val Cys Met  
 1 5 10 15

Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Asn Leu Glu Gly Ala Arg  
 20 25 30

His Gly Ser Cys Asn Tyr Ile Phe Pro Tyr His Arg Cys Ile Cys Tyr  
 35 40 45

Phe Pro Cys  
 50

&lt;210&gt; 77

&lt;211&gt; 51

&lt;212&gt; PRT

&lt;213&gt; Raphanus sativus

&lt;220&gt;

&lt;221&gt; SITE

&lt;222&gt; (1)

&lt;223&gt; Xaa is pyroglutamyl

&lt;400&gt; 77

Xaa Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly  
 1 5 10 15

Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg  
 20 25 30

His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Lys Cys Ile Cys Tyr  
 35 40 45

Phe Pro Cys  
 50